[1]University Medical Center Utrecht, Utrecht, Utrecht, The Netherlands, [2]National Institute for Public Health and the Environment, Bilthoven, The Netherlands

OBJECTIVES: To demonstrate a simplified approach to cost-effectiveness analysis of new diagnostic tests based on minimal information and without developing a full decision-analytic modeling framework, which is often complex, time consuming and potentially inefficient. **METHODS:** Using a simplified decision-analytic approach to the complete pathway of care from diagnosis to subsequent treatment, cost-effectiveness of the new diagnostic test is expressed as a mathematical function of diagnostic accuracy, cost, burden, and the cost-effectiveness of treatment. This function only includes parameters available during early test development phases and does not require any simulation. Parameter uncertainty is accounted for by applying probabilistic sensitivity analysis. In a clinical example, the cost-effectiveness of magnetic resonance angiography (MRA) compared with digital subtraction angiography (DSA) for the detection of new intracranial aneurysms is assessed in patients with previous subarachnoid hemorrhage. **RESULTS:** The simplified approach produced cost-effectiveness results for MRA compared with DSA in line with our previous and similar, but much more comprehensive assessment. The comprehensive assessment resulted in a net monetary benefit (NMB) of $1,910 (95%CI −1,809 to 5,565) and probabilities of effectiveness and cost-effectiveness of 98% and 87%, respectively (Willingness-to-pay threshold $50,000 per QALY). Our simplified approach returned a NMB of $1,779 (95%CI 1,170 to 2,477) with corresponding probabilities of effectiveness and cost-effectiveness of 100% and 98%, respectively. Hence, the simplified approach would already have provided a clear indication of the potential benefits of replacing DSA with MRA. **CONCLUSIONS:** Given the abundance of new diagnostic tests an approximation of the cost-effectiveness of new tests at minimal costs is highly valuable. Our low-cost mathematical satisficing approach supports improved use of health care resources by indicating 1) which tests are promising; 2) which tests are not promising; and 3) which tests require more rigorous economic evaluations to obtain improved estimates of cost-effectiveness but at a higher use of health care resources.

PRM66

DISCRETE EVENT SIMULATION: MODELING SIMULTANEOUS COMPLICATIONS AND OUTCOMES

Quik EH, Feenstra TL, Krabbe PFM
University of Groningen, University Medical Center Groningen, Groningen, Groningen, The Netherlands

OBJECTIVES: To present an effective and elegant model approach to deal with specific characteristics of complex modeling. **METHODS:** A discrete event simulation (DES) model with multiple complications and multiple outcomes that each can occur simultaneously was developed. In this DES model parameters, attributes and distributions were estimated based on patient population (patient-level DES model). Next to this, the DES model was constructed in such a way that it is particularly capable to deal with: different disease states, multiple complications, and multiple long-term outcomes. Our model was designed for comparing two radiation treatments (photon vs. proton) for head and neck cancer. In this model the following elements were included: different disease states (local recurrency, distance metastasis, and combinations), simultaneous complications (xerostomia, sticky saliva, dysphagia, and thyroid dysfunction), and multiple long-term outcomes (overall survival, quality of life, costs). Estimates were based on the patient population (n=1013) treated with radiation therapy for head and neck tumor and combined with literature based estimates. **RESULTS:** The following discrete events were scheduled by a so-called statechart (system of graphical specification): primary tumor, mortality, time-to-event, and disease states. These events are scheduled with transitions following distributions that depend on tumor and other patient characteristics. In addition, the model contains a module for the primary tumor prognosis, and separate, parallel modules/events for each important complication. Costs and values of health for the different states/complications and combined to cost-effectiveness are included. **CONCLUSIONS:** This elaborated DES model allows multiple complications and outcomes to be modeled in parallel and is suited to estimate the long-term effects. The global structure of our model can be interesting for modeling other diseases that are associated with complex treatment regimes and multiple complications. In addition, side effects in parallel to main effects can be modeled and multiple outcomes of new pharmaceuticals compared to current medication.

PRM67

THE USE OF HEALTH ECONOMIC MODELS IN HUNGARIAN HEALTH TECHNOLOGY ASSESSMENT

Nemeth B, Borsi A
National Institute for Quality- and Organizational Development in Healthcare and Medicines, Budapest, Hungary

OBJECTIVES: To identify the possible problems and trends regarding health economic modelling in Hungarian Health Technology Assessment. We were especially interested in the general quality of health economic models. **METHODS:** We analyzed the submissions which were based on a health economic model, which were assessed by the Hungarian HTA Office since 2004. We created a database in which we summed up our findings: the type of the model, the quality and robustness of the model, the type of disease which was modelled. We sorted the models by these criteria and searched for correlations. We attempted to set some indicators regarding the quality of models. We also analysed some methodological and procedural problems from multiple aspects related to modelling in Hungary. **RESULTS:** Our findings show that the use of health economic models is increasing and that most of the models are decision tree and Markov types. The submitted Markov models are from the subtype of Markov chain models with only a few exceptions. Primarily simulation models are only used in a small share of submissions (11%), especially in the cases of chronic diseases. Trends show that the proportion of Markov models which have probabilistic sensitivity analyses are also increasing (from 0% to nearly 30%). The submitted models became more detailed and they show a distinct improvement in methodology during the past 8 years. These factors indicate the general improvement of the quality of Hungarian health economic modelling. **CONCLUSIONS:** Although it is not compulsory in Hungary, more and more manufacturers present or submit health economic models to the Department of Health Technology Assessment. Based on our findings, several factors indicate that the submitted models are getting more detailed, and better of quality.

PRM68

COMPARATIVE COMPUTATION SPEED OF EXCEL, VISUAL BASIC FOR APPLICATIONS, R, AND JAVA IN EXECUTION OF A MICROSIMULATION MODEL WITH PROBABILISTIC SENSITIVITY ANALYSIS

Snedecor SJ[1], Ji X[1], Ektare V[1], Treur M[2]
[1]Pharmerit International, Bethesda, MD, USA, [2]Pharmerit International, Rotterdam, The Netherlands

OBJECTIVES: To compare the computation speed when running a microsimulation model and probabilistic sensitivity analysis (PSA) on four widely-available programming platforms: Excel, Visual Basic for Applications (VBA), R, and Java. **METHODS:** A simple microsimulation model predicting the number of handouts collected by 2500 ISPOR attendees during a congress was created to test efficiency measured by model running speed. Speed was based on the system time and included only the portion of code used to run the model, excluding any code for parameter input or output. Calculations were performed on a computer running Windows 7, dual core 2.6 GHz processor, with 4 GB RAM. All platforms except Excel were cross-validated by using a list of pseudo-random numbers as model inputs to ensure consistency of model outputs. PSA was conducted by sampling random probabilities from beta distributions and replicating the model 1000 times. Ten simulations of each base-case and PSA model type were run to assess variability in platform efficiency. **RESULTS:** The speed of Excel could not be timed in the base-case microsimulation since results were calculated instantly. VBA was slower than R with means of 0.09 seconds and 0.02 seconds, respectively. Java generated a system time of zero, indicating the program required <0.001s. The Excel PSA simulations required the most time with 33.4s, followed by VBA (29.4s). R required 19.0s and Java required the least amount of time (4.0s). CPU usage for PSA simulations was highest with Excel (~80%) and similar for all other platforms (~25%). **CONCLUSIONS:** With the obvious caveats that program speed is a function of computing power and coding efficiency, the results of this analysis demonstrate Java was consistently faster than Excel, VBA and R, which are commonly used for pharmacoeconomic models. With increasing model complexity and running times, exploration of alternate implementations for their execution is recommended.

PRM69

NETWORK META-ANALYSIS OF INTERVENTIONS FOR OVERACTIVE BLADDER AND DETRUSOR INSTABILITY – A HIERARCHICAL MODELLING APPROACH

Owen RK, Abrams K, Tincello DG
University of Leicester, Leicester, UK

The current recommendations for the conservative management of overactive bladder symptoms and detrusor overactivity, given by NICE 2012, are pelvic floor muscle training, bladder training, sacral nerve stimulation, mid-urethral tape and antimuscarinic drugs- oxybutynin, darifenacin, solifenacin, tolterodine, and tropsium. More recently, emerging evidence suggests that Botulinum toxin type A is also an effective intervention for overactive bladder and idiopathic detrusor overactivity. Although a number of meta-analyses have been published reporting pairwise comparisons of the various interventions, to date no network meta-analysis has been undertaken comparing all interventions simultaneously. **OBJECTIVES:** To evaluate the clinical effectiveness of drug therapy, neuromodulation, botulinum toxin, and behaviour therapy, in the prevention of overactive bladder symptoms and detrusor overactivity. **METHODS:** Mixed treatment network meta-analyses for the individual, and classes (i.e. behaviour, drugs etc.), of interventions using WinBUGS. The correlations between the interventions within a class were addressed by conducting a mixed treatment network meta-analysis using a hierarchical model structure. **RESULTS:** Evaluation of the class of interventions, i.e. 'lumping' individual interventions with classes, demonstrates an increased precision in the outcome; however, categorising the interventions decreases the interpretability of the results. At the individual intervention level, the sparseness of the data decreases the precision of the estimates, but enables comparisons to be made between individual interventions. The hierarchical model, allows both increased precision, due to the utilisation of all of the available data, whilst still allowing comparisons to be made between individual interventions both within and between classes. **CONCLUSIONS:** Use of a hierarchical model increases the interpretability of the mixed treatment network meta-analysis whilst maximising the precision in terms of outcome. However, defining the hierarchical structure can prove difficult in some instances, with potential comparators residing at different levels in the hierarchy.

PRM70

WHAT IF ALL OTHER THINGS ARE NOT EQUAL? – ACCOUNTING FOR FUTURE CHANGES IN THE DECISION CONTEXT WHEN EXTRAPOLATING COST-EFFECTIVENESS RESULTS OVER TIME

Asaria M, Palmer S
University of York, York, North Yorkshire, UK

OBJECTIVES: Cost-effectiveness studies of health technologies where data are extrapolated from short term clinical trials to estimate results over appropriate decision making time horizons typically assume that the decision context remains